Building A Shared Present and Future:

Learnings from Henry Ford and Albert Kahn's Co-Wuity Collaborative Innovation Network on the Moving Assembly Line and Mass Production

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Abstract The purpose of this paper is to demonstrate how to build a shared present and future through Collaborative Innovation Networks (COINs) using a historical case study of the timely and unique Co-Wuity partnership between Henry Ford the automotive industrialist, and Albert Kahn, the Detroit Architect who designed and built over 1,000 buildings for Ford over 34 years from 1908 to 1942. The Co-Wuity partnership means when two people interact with a style of thought for insightful problem solving using a process of mindful observation and visual analogy.

Ford was building an automotive manufacturing company, which was designing and manufacturing a vehicle in standardized high volumes and that needed a new building to meet that growing demand. Kahn was building an architectural firm, which was designing custom building plans on a project by project basis to meet the needs of his clients, also on a high-volume scale.

Both developed Wuity behaviors of mindful observation and visual thinking to gain insights for innovations, experimentation, and implementation to see and understand what worked in their respective ventures, influencing each other's businesses in the present and future performance.

The focus of the case is on the emerging and future technologies at that time, on how COINs strengthened adaptability and transformability to leverage novel ideas as a competitive advantage using the two early 19th century startups: The Ford Motor Company and Albert Kahn Architects and Engineers as our historical case study.

Our goal is to inspire today's leaders by demonstrating the lessons that these past leaders taught us about how to build a shared present and future through a Collaborative Innovation Network. In addition, this case extends the analysis from intrapersonal Wuity to a Co-Wuity or interpersonal Collaborative Innovation Network.

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1 Introduction

The year was 1896 and two entrepreneurs had launched their careers in the City of Detroit, Michigan, which would not overlap until twelve years later in 1908 and change the course of history for the future of industrial mass production and factory architectural design.

In January 1896 Albert Kahn, age 27, launched a new architectural firm with two partners. Six months later in June 1896 Henry Ford, age 33, took his first gasoline powered Quadricycle for a drive through the City of Detroit. Thus, begins the historical case study of the circumstances and context that would result in a 34-year collaborative learning experience from 1908 to 1942 and the design and construction of some 1,000 buildings for these two aspiring young men.

The paper builds the picture of the social interaction between these two leaders, and their respective teams and how each learned from the other to achieve their business goals. In short, this is a story of the Co-Wuity Collaborative Innovation Network, when two people interact with a style of thought for insightful problem solving using a process of mindful observation and visual analogy.

The paper is organized into four main sections: Literature review, The Historical Case Study, Lessons Learned for today's entrepreneurs and ends with the section Conclusion and Future Research.

2 Literature Review

Mindfulness is an important topic in cognitive science, medical science, psychology, and management. After forty years of study, mindfulness has been recognized as a state of mind having a wide conscious attention and an altered trait such as neuroplasticity from long-term practice, which creates both structural and functional brain changes (Dane 2011; Goleman and Davidson 2017; Langer 1989)

Wuity is a style of thought with the ability to gain intuitive understanding of underlying phenomena for insightful problem solving through a process of mindful observation and visual analogy. Wuity is a collective thinking model long used for centuries in China, but it is also an inherent higher cognitive skill through training the mind by being mindful in modern society. Wang and her coauthors introduced Wuity to management innovation (Wang and Gloor 2018; Wang and Li 2017, 2018). For innovators, scientists and entrepreneurs, a series of Wuity six steps have been identified to help gain intuitive understanding, insights and innovation. They are: getting stuck, letting it go, mindful observation, visual analogy, gaining insights, and implementation (Wang and Gloor 2018). "Getting stuck" means an individual or team has come to an impasse and cannot solve a problem or issue.

“Letting go” means taking a step back and abandoning the current train of thinking, discarding preconceived ideas. “Mindful observation” is observing and seeing with awareness, which is the careful attending to internal and external phenomena (e.g., thoughts, emotions, sounds, smells, or proprioceptive sensations). Visual analogy is an analogical reasoning process based on the similarity and connection among dynamic perceptual imagery and mental images. Visual mental images have led many people to liken this concept to “seeing with the mind’s eye.” “Gaining insights” means to understand how different domains are related to one another at the most basic level. Gaining a clear and deep insight is the most productive and transcendental result of Wuity thinking. Once a good analogy between different domains is found, confusion and contradiction caused by superficial observations disappear and the result is clarity and meaningful insights for problem solving. “Implementation” means the ability to put into practice those insights gained from the process of letting go, mindful observation, and visual analogy. Previous Wuity research has focused on the level of intrapersonal, whereas in this paper the focus is on the interpersonal level or between people.

Gloor in his recent books (Gloor 2017a, 2017b) identifies six directional indicators for high performing teams based on over 14 years of studying Collaborative Innovation Networks or COINs. These studies have relied on the use of social network analysis of email, blogs, web sites, and twitter data to identify and confirm the credibility of these indicators on team performance. Since our paper is a historical case study of a relationship that occurred over 122 years ago, we rely upon archival books and other sources to reconstruct our case.

Gloor’s six indicators are: central leadership, rotating leadership, balanced contribution, rapid response, honest language, and shared context [1]. For the purposes of this paper we will provide a non-technical definition of these six indicators. “Central leadership” means a clear visible leader who acts as an information hub and controls information and decision making. “Rotating leadership” means other team members may take turns and assume a leadership position besides the central leader. “Balanced contribution” means team members equally listen, direct, and contribute with no member always dominating or being silent. “Rapid response” means team members are quick to respond to other team member requests, questions, or inquires. “Honest language” means team members are truthful and use both positive and negative language in their communication. “Shared context” means that team members use a common vocabulary as well as a understand the same fundamental norms for how work gets done and how to relate to one another.

Weick and Sutcliffe in their three books ***Managing the Unexpected***, use the term “mindfulness” as a higher order category for five specific behaviors that are found in high reliability organizations (Weick and Sutcliffe 2001, 2011, 2015). They il-

[1] For the technical network definitions and calculations of Gloor’s six directional indicators of high performance teams (Gloor 2017a, see Table 3, p. 52-53)

lustrate the presence of these behaviors in exemplary stories from nuclear power plants, firefighting crews, hospitals, banks and more. Rather than a focus on how to avoid failure or quickly recover from a failure, the emphasis in our paper is on processes of creativity, innovation and building something new.

Our contribution to the literature is an interweaving of two streams of research based on the six process steps of Wang's Wuity and Gloor's six directional indicators of high performance teams using an historical archival case analysis method as exemplified by Weick and Sutcliffe.

3 Historical Case

Ford and Kahn's partnership went through a developmental sequence from the 1908 Highland Park Plant with the launch of the Model T, to the 1915 colossal Rouge Plant Complex, and finally to the 1941 Willow Run Bomber Plant. The purpose here is to articulate the Co-Wuity creation process between Ford and Kahn and the social interaction that resulted in their mutual business success focusing on their first interaction with the design of the Highland Park Plant.

The primary question of this paper is how do Wuity and high performance teams relate to each other? We are interested in the lessons learned from this historical relationship between Henry Ford and Albert Kahn for today's entrepreneurs.

Table 1 summarizes and juxtaposes Wuity's six process steps and Gloor's six Indicators of High Performance Teams. The Highland Park Plant will illustrate how these six Wuity process steps and the six team indicators were interwoven to build a successful future for Henry Ford and Albert Kahn.

Table 1 Wuity's Six Process Steps (Wang and Gloor 2018, p. 172-173) and Gloor's Six Indicators of High Performance Teams (Gloor 2017a, p. 55).

Wuity Six Process Steps	Gloor's Six Indicators of High Performance Teams
1. Getting Stuck	1. Central Leadership
2. Letting Go	2. Rotating Leadership
3. Mindful Observation	3. Balanced Contribution
4. Visual Analogy	4. Rapid Response
5. Gaining Insights	5. Honest language
6. Implementation	6. Shared Context

Note: Brackets "[]" will be used within in the following text to indicate where we *have identified Wuity six steps and Gloor's six high-performing team indicators*

3.1 The Highland Park Plant

In 1908 Henry Ford [central leader] recognized that his current factory for automobile manufacturing could not keep up with the demand for automobile orders, which was driven by the "bulldog driving energy" of James Couzens, his Piquette Plant manager. Couzens's constant nagging of dealers and branch agencies to buy and sell represents one team member's [balanced contribution] and [honest language] with the constant message of, we need more space! (Sorensen et al. 2006, p. 84). Other team members who shared the same plant space, a [common context,] could see for themselves that Couzens was right.

The Ford Piquette Plant[2] was a typical masonry construction building, with floors supported by wooden beams and exterior load-bearing walls (Smith 2017, Chapter 1, Working for the Dean. Fig. 6). Ford himself realized that Couzens was right and bought an initial 60 acres of land in Highland Park as the site of his new factory. He contacted Albert Kahn, a local Detroit Architect, to build a new factory there.

Ford was [getting stuck] to solve the problem of the slow expensive automobile production. He and his team members [let go] of the prevailing idea of moving the worker to the work and had the [mindful observation] of moving the work to the worker through [visual analogy] in observing how meat packers and mill houses worked, with the [gaining insight] of a moving assembly line as a new idea to be "[implemented] in this new plant.[3]

The following provides some context for the development of the assembly line (Nevins and Hill 1954).

> The continuous conveyor belts to bring materials up to assembly lines were the work primarily of Ford and Sorensen. A mechanic named Gregory, who had once worked in a brewery which used conveyors to lift grain from storage bins to mash tanks, suggested late in 1912 that a line of moving hoppers be employed to carry mixed core sand to chutes above the mould-makes's bench.
>
> Of the group interested in the development of moving assembly lines, Clarence W. Avery had the broadest grasp of the subject and showed the

[2] For photos of the Ford Piquette see: https://www.google.com/search?q=Pic:Ford+Piquette+Plant&rlz=1C1CHBF_enUS739US739&tbm=isch&tbo=u&source=univ&sa=X&ved=0ahUKEwihzuPbvJnbAhWRFXwKHfNxCg4QsAQIfg&biw=1833&bih=1196 Last accessed on May 22, 2018.

> most intelligent initiative. Early in 1912 Avery joined the Ford Motor Company, whereas Sorensen's assistant he gained a rapid knowledge of machine tools and technological processes [shared context].
>
> To be sure, Ford [central leader] took a special interest in the magneto assembly, but elsewhere able employees like Gregory, Klann, and Purdy made important suggestions [balanced contribution]; Sorensen [rotating leadership] and others then helped work them out, while Ford [central leadership] gave encouragement and counsel. The largest single role in developing the new system, however, was played by this university-trained thinker, Avery, so recently brought in from his schoolroom (p. 472, 474).

Ford wanted Albert Kahn to build his Highland Park plant because Kahn had generated a reputation for building an innovative automotive plant for a competitor, James Joy, manager of the Packard Motor Car Company. Ford was especially impressed with Packard Building 10 that was built in Detroit in 1906. Kahn's design of Building 10 had solved some of the fundamental problems in previous designs. The following passage describes the problems that were present in previous factory designs and how Kahn approached and solved them (Matuz 2002).

> Factory buildings at the time were cramped and required thick walls and many columns running from the floor to the ceiling to support the floors and roof above. Parts of the floors, walls, and columns were often made of wood, and they easily became fire hazards when oil and greased soaked in (p. 49).

Albert was not satisfied with his progress with Joy's ideas using the Packard old style factory design in the first nine buildings. Albert had become [stuck]. However, for the tenth building, he imagined a new modern factory design [letting go] (ibid).

> As he began preparing the tenth building, he approached the design like a problem that needs to be solved. The problem is [mindful inquiry]: how can he create more inside space by having fewer support columns?
> "What we need is a large, open space, where workers will be comfortable," [mindful observation and honest language]. Albert explained to Julius, his civil engineer brother, "We need to support the weight of the building without dozens of bulky columns running from the ceiling to the floor [visual analogy]. We need to provide enough space for people to work in a single area. Also, we also need to find ways to let sunlight and fresh air in". [mindful observation and honest language] (p. 49).

The new idea was to design and build a concrete structure with steel reinforcement using his brother [gaining insights], Julius's patented Kahn Bar [rotating leadership, and shared context], who formed his own company, The Trussed Concrete

Steel Company holding this valuable patent in 1902 (Matuz 2002, p. 47). The idea of using steel reinforce concrete grew out of Albert's and Julius's [shared context] of building the University of Michigan's Engineering Building in 1903 and the Pierce Great Arrow Automobile Plant in Buffalo, NY in 1906 (Bucci 2002, p. 33, 37).

Thus, Ford could see that the Packard Building 10[4] solved the obstruction issue caused by numerous interior columns and walls. This open factory design created a large free space for manufacturing flexibility. Plus, it had the added advantage of lots of sunlight from the large wall side widows, which could be open for ventilation. The construction had a further benefit of being more fireproof than a wood supported structure, which reduced insurance costs as well [implementation].

However, Ford's vision was bigger than just a building. The story unfolded in 1908 when Ford called Kahn to design Highland Park Plant and asked abruptly (Op cit.):

> "Mr. Kahn, can you design more efficient factories?" [central leadership]
> "Mr. Ford, I can design anything," [rotating leadership]
>
> They met a week later at the Ford Factory on Piquette Ave. in Detroit.
>
> Then Ford drove them to the proposed Highland Park Plant 230-acre site: "I want to make a car that is inexpensive, easy to use, and produced in large quantities." … "I plan to have the entire car built under one roof, from start to finish." [honest language]
>
> "Impossible," thought Albert … but he was still intrigued. [honest language]
>
> Then returned to Piquette office where Kahn made a sketch putting the building in the middle of the property. Ford, interrupted, "You've only got part of the idea. … I want the first building constructed right up along Woodward Avenue so that I have room to expand behind, to other parties [sic]of the property. This factory will take us into the future. Everything will be geared to building cars faster. Each worker will perform only one task, with all the parts and tools they need right by their side. Someday, instead of having workers move around to stations, we will have a moving assembly line that bring work to the workers." [shared context] (p.52).

From this exchange we can see Henry Ford in his role as a [central leader] using

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[4] For photos of the Packard Building #10 see: http://ilovedetroitmichigan.com/detroit-architecture/albert-kahn-400-buildings-in-metro-detroit/ #63 Packard Building.] . Last accessed on May 22, 2018.

[honest language] and a [shared context] to solve a [getting stuck] problem, the slow expensive automobile production. Ford wanted a [rapid response] from Kahn, and he got it. Kahn made an immediate sketch and perfected it in a back and forth collaboration with Ford. In less than 18 months Ford's Highland Park Plant[5], four stories high (85 X 860 feet), opened on New Year's Day 1910 (Matuz 2002).

> It was nicked name the "Crystal Palace", because its windows which ran along the side of every floor and parts of the roof, glistened in the sunlight and provided great light for work going on inside. The building's large open space allowed all production to take place under one roof. … It allowed for assembly of a car to progress to different areas, where different parts were stored. That would be impossible in the old mills, where many columns interfered with free movement (p.55).

Compared to the Packard Building 10, the Highland Park Plant is 42% or 25 feet wider, 167% or 538 feet longer, and twice the height at four stories.

Albert Kahn continued his [mindful observation] of construction methods with the use of reinforced concrete for multi-story buildings, window monitors for roof ventilation, sash windows on the plant walls to allow sunlight into the plant for a more productive worker environment as well as increasing the fire protection of the building.

From the Wuity six step process, Albert Kahn overcame [getting stuck] in using the traditional factory plant wood and masonry designs and was able to [let go] and test out new innovative techniques with steel reinforced concrete for multistory buildings, roof window monitors for ventilation, and large sash windows for walls allowing more sunlight into the plant. The results were immediately visible with more open unobstructed floor space necessary for flexible manufacturing with large amounts of sunlight and ventilation. It took [mindful observation] of impact of these designs along with the [visual analogy] architectural drafting and drawings to realize these [insights] in the actual [implementation] and construction of these factory buildings in a very short time.

From Gloor's six indicators of high performance teams we can observe Albert Kahn's [central leadership] skill of listening to his clients and rendering a factory plant design to meet their unique and growing factory plant needs. [Rotating leadership] was clear using the Kahn Bar reinforced concrete, innovations of his brother Julius, which helped obtain a [balanced contribution,] with a [rapid response] through the speedy delivery of his final drawings and the actual construction of the factory plant. We need to assume an [honest language] exchange between Ford and Kahn based on a [shared context] of factory building requirements

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[5]For photos of the Ford Highland Park Plant see: http://ilovedetroitmichigan.com/detroit-architecture/albert-kahn-400-buildings-in-metro-detroit/2/ #104, #105, #106, #107 and #108. Last accessed on May 22, 2018.

and the resources available to both men in the greater Detroit area.

While the Highland Park Plant was being built, Ford and his team continued to experiment with improving the manufacturing efficiency and cost reduction and conducted small assembly line production in subassemblies at the Piquette Plant beginning with the Model N.

It took about five years of trial and error experimentation starting at the Piquette Plant in 1908 until 1913 when the "assemble line" was completely worked out, which was three years after the Highland Plant opened in 1910. Also, Ford's team did not invent any of the processes that they finally used. They just combined all these processes in a unique way. They used their [mindfulness observation] and [visual analogy] skills to string it all together [gaining insights and implementation].

As Charles Sorensen stated in his book, *My Forty Years with Ford*, this was a time of considerable experimenting with mass production and the assembly line. Here he states his recollection of these times (Sorensen et al. 2006):

> … An equally slow evolution was the final assembly line, the last and most spectacular link in mass production. Both "just grew," like Topsy. But, whereas the car evolved from an idea, mass production evolved from a necessity; and it was long after it appeared that the idea and its principles were reduced to words.
>
> Today, we do not hear so much about "mass production" as we do about "automation." Both evolve from the same principle: machine-produced interchangeable parts and orderly flow of those parts first to subassembly, then to final assembly. The chief difference is that mechanized assembly is more complete in automation; where men once tended machine tools, the job is now done electronically, with men, fewer of them, keeping watch over the electronics.
>
> Interchangeable parts were not new in 1913. Johann Gutenberg, the first printer in the Western world to use movable type, employed that principle five hundred years ago. Eli Whitney used interchangeable parts when making rifles in the early days of the Republic; and in early days of this century Henry Leland, who later sold out to Ford, applied the same principle in the first Cadillac cars. Overhead conveyors were used in many industries, including our own. So was substitution of machine work for hand labor. Nor was orderly progress of the work anything particularly new; but it was new to us at Ford until, as I have already described, Walter Flanders showed us how to arrange our machine tools at the Mack Avenue and Piquette plants.
>
> What was worked out at Ford was the practice of moving the work from

> one worker to another until it became a complete unit, then arranging the flow of these units at the right time and the right place to a moving final assembly line from which came a finished product. Regardless of earlier uses of some of these principles, the direct line of succession of mass production and its intensification into automation stems directly from what we worked out at Ford Motor Company between 1908 and 1913. Henry Ford is generally regarded as the father of mass production. He was not. He was the sponsor of it (p. 115, 116.)

Henry Ford and his early team were a Collaborative Innovation Network. The team included James Couzens, "who controlled expenditures, organized sales, and set the pattern for business operations, … and drove the company into the new Highland Park Plant" (Sorensen et al. 2006, p.36), Harold Wills in metallurgy and tool design developing new steel alloys and their uses and setting up the Ford laboratory, Walter Flanders who was an expert at rearranging the machines on the shop floor, Charles Sorensen who was a pattern maker and Ford's translator of his ideas into physical drawings and objects, and Ernest Liebold, Ford's personal secretary, who wrote every letter and handled all of Ford's correspondence. Together this diverse team moved Ford Motor Company from [getting stuck] in a highly skilled custom hand-made automobile era to a new era of high volume mass production and the continuous movement of material from one end of the plant to a finished product at the other end. The team [let go] of the idea of hand-made custom, one-of-a-kind automobiles. The team members were [mindful observation] of moving work to the worker, rather than moving the worker to the work as a [visual analogy] from observation of practices in other industries. Visual clarity helped the team [gain insights] about how the substitution of unskilled labor using precision machines to make interchangeable parts could lead to a dramatic cost reduction. The team [implemented] these ideas through the sequencing of machines and the flow of subassemblies into a final product, a car.

Henry Ford was the [central leader] but also engaged in [rotating leadership] with each of the COIN members making a [balanced contribution] within their areas of production, sales, and cost reduction. Their responses were [rapid] because the team members were in the factory, on the shop floor, and could see and measure the results of their efforts and experiments. Their language was [honest,] even if harsh and loud at times, but they shared the same [context] and wanted the high volume, low cost production to work.

In 1914, after four years of experiments with mass production and the assembly line, the Highland Park Plant was in full swing and Ford made 248,307 Model T's (Matuz 2002, p.57).

With sales skyrocketing the price was dropping from $780 down to $360. Stockholders profits rose from 4.1 million in 1910 to $57.1 million in 1916 (PBS American Experience Features Henry Ford).

Nevertheless, success brought back the reoccurring problem; they needed a bigger plant. In 1915, Ford and Kahn were back designing and building another new plant named the Rouge Plant.

3.2 Mindful Social interaction and Shared Present and Future

Albert Kahn's diverse client relationships with the automobile companies, and especially Henry Ford, provided him with an upfront, close, and insightful perspective about how mass production was being conceived, organized, structured, and built. Starting with his first automotive client James Joy and the Packard Motor Car Company, he learned about the importance of building design for the flow of material through a factory building. This was reinforced with the joint architectural work on the Pierce Great Arrow Automobile Plant in Buffalo, New York in 1906 that illustrated the segmenting and sequencing of work across seven buildings. Henry Ford's contract to build the Highland Park Plant enabled Kahn to listen to Ford's vision of how he planned to create an assembly line for a high volume and low-cost automobile. The Model T and the Rouge Plant contract in 1918 reinforced how Kahn was to organize and structure his own office using many of the principles he had been exposed to. The automobile companies were designing and building a physical product – an automobile. Khan was designing and delivering a knowledge product – a building plan to be produced. Kahn's office staff grew from just a few people in 1901, to 40 in 1910, to 80 in 1918, to 200 in 1923, and by 1935 the staff had grown to between 400-600 (Hildebrand 1974, p. 6, 126, 153).

Using the Wuity six-step process, Kahn found himself [getting stuck,] asking himself how do I complete so much work? He [let go] of the conventional architectural firm practice of just delivering an artistic building set of drawings, but instead had the [mindful observation] to assemble a diverse, multiskilled team to collaborate using the [visual analogy] of a mass production assembly line to organize the complete design planning process or sequence of steps from start to finish. The collaborative team gained [insights] about how to deliver such a comprehensive and harmonious plan for its [implementation] or construction for high volume and speed (Bucci 2002).

> "Albert Kahn stated in an article "Architectural Trend," published in 1931, declared the end of the era" of individualist, the temperamentally[sic] artist," [letting go] replacing this figure with "the collective efforts of group of men cooperating [rotating leadership] under proper direction." [central leadership] (p.126-127).

The Kahn office layout [visual analogy] was organized like Ford's Highland Park Plant for high volume and [rapid response] as described in a column by G.C.

Baldwin in The Architectural Forum, vol. 29, no 5, November 1918, (p. 125-126). As follows (Ibid):

> In addition to executive offices, an atrium, corridors, underground passageways, facilities, sample rooms, dressing rooms, meeting rooms, and a library, there are two large design rooms. There are also separate rooms for the mechanical and structural engineers, one area for design, two areas for specific technicians, one for the compilers of these specifics, a separate room for the typists, offices for the head superintendent and for the field superintendent, a room for estimators, and two places for filing the contracts and correspondence. The offices for the executives and the meeting rooms are arranged along one side of the building, the design rooms along the other. The mechanical engineering and the structural engineering departments are situated on opposite corners. … The superintendents' offices are arranged in two groups on both sides of the meeting room. The hallways that serve them both are floored with artificial, sound proof tiles … The designers' rooms are separated by clear glass divisions. The offices are enclosed walls, and every office is equipped with a telephone for the city, an internal telephone and an intercom (p.128).

This office layout has been designed for maximum efficiency and clusters people close to one another for ease of communication, [rotating leadership, balanced contribution] including equipping everyone with three modes of electronic communication [rapid response].

Kahn had devised a method for determining the status of any given project [central leadership] as reported by G.C. Baldwin as follows (Hildebrand 1974):

> All departments [balanced contribution] have graphical progress reports on their work [shared context]. At the beginning of any work the estimated progress was indicated by a curve in black ink on a co-ordinate paper, and the actual progress recorded from day to day in red ink [honest language]. Any marked divergence in these curves indicates serious delay, and daily inspection of the records enables prompt action to be taken to remove it [rapid response]. The superintendent's reports [sic] the progress in this way and also by means of daily and weekly reports [balanced contribution]. Thus, a general and detailed supervision of all work is possible from the executive offices [central leadership] (p.60).

Hidebrand cites how this office work process parallels Ford Motor Company's Highland Park operations (Ibid):

> Eighteen different paperwork forms [shared context] were used for job records, not including general records and interoffice communications [honest language]. These forms were similar to those used by the Ford Motor Company in its operations at Highland Park. The entire organiza-

> tion of the work progress … recalls the automobile industry's 'complex system for charting stock inventory, the transfer of materials, job routing, and the precise state of each assembly-line [balanced contribution and honest language] at a given moment [central leadership].' (p.60)
>
> Kahn has been described as a "rigorous administrator" and an "arduous taskmaster" who demanded an intense team effort from all his employees. He did not tolerate "backbiting" and if someone complained about someone else he and the defendant were taken to Kahn's office for the dispute to be settled and dropped [honest language]. "Prima donnas repressed their egos or were dismissed" Kahn saw himself as a conductor of a symphony [central leader] and the objective of the talents [rotating leadership] were toward an end impossible to achieve by and single participant (p. 126-127).

From the point of view of Gloor's six indicators of high performing teams, Kahn's office exhibits a high match. Kahn was a strong [central leader,] who demanded the people contribute their expertise ensuring a [rotating leadership] and [balanced contribution] among the multidisciplinary team members. [Rapid response] was the expectation to close any gaps in the projects' performance time using face-to-face communication in team meetings or one of the three electronic means of communication. It is assumed the team members used [honest language] to resolve conflicts because they had a [shared context] to deliver a building that worked for the client's needs.

This office system was put to test in 1929 when Kahn was contracted to rebuild Russian factories in four years between 1929-1933. On May 7, 1929 a New York Times Headline read: "America to Build Soviet Auto Plants." Albert Kahn Associates sets up offices in Moscow, headed by his brother, Moritz Kahn. Moritz supervised the design of more than 500 buildings including: steel, automotive, tractor factories, as well as airplane and chemical plants with the support of the home office in Detroit. To design so many buildings so fast, over 1,500 Soviet draftsmen were employed. They worked during the day and attended classes at night to learn the techniques of Albert Kahn (Matuz 2002, p. 81)

In this way, Albert Kahn, set up a Collaborative Learning Network for the Russian government to help them quickly rebuild. At the same time Charles Sorensen from Ford Motor Company negotiated with the Russians some 40 million dollars in business from 1929-1936 to teach the Russians how to build auto and steel plants based on the Rouge Plant. (Sorensen et al. 2006, p.193)

In summary, Henry Ford and Albert Kahn are an example of a Co-Wuity relationship whose high-performance teams extended their Collaborative Innovation Network (COIN) to a Collaborative Learning Network in helping to train Russians and rebuild Russia after WWI.

4 Lessons Learned for Today's Entrepreneurs

In building a shared present and future what can we learn from two startups and their founders, Henry Ford of the Ford Motor Company and Albert Kahn of Albert Kahn Architects back in 1896 some 122 years ago?

What are the key aspects of their personalities and Co-Wuity relationship of 34 years along with their High-Performance Teams that today's entrepreneurs and their startups can learn from and benefit from today?

Both founders, Henry Ford and Albert Kahn, had developed the very keen personal quality of mindfulness and applied this skill over and over in their respective business areas, and shared the results of their talent with one another. Henry Ford was relentless in his pursuit of a high volume low cost car for the common man. This led him and his team to be mindful and use a wide range of existing practices in a unique combination to form a whole process, what is called today mass production. The moving assembly line that moved work to the workers rather than workers moving to the work, sequencing machines that made standardized parts, purchasing in large quantities to smooth production, and avoiding slow-downs or stoppages due to part shortages, vertically integrating all the raw materials of iron ore, steel, glass, rubber, and other parts, all designed to produce the seamless, continuous movement of material.

Ford was mindful that the new transportation networks of rail, waterways, and roads were keys to the continuous movement of material in, through and out of his plants. All these components needed to work seamlessly together as a whole. This was a time when Ford and his team could visibly see everything on the plant floor, whether the production was working or not; there was simple measurement of production output, at what cost, and profit.

Albert Kahn likewise honed his mindfulness skill in the observation of the relationship between a building's interior space and exterior construction. His life was devoted from early childhood through adulthood to observing by drawing and sketching a wide variety of buildings and architectural styles. But it was not just his talent for drawing fast and with great detail alone that was so important. He had developed an intuitive understanding of how interior space and its construction worked. Kahn had studied a wide variety of architectural styles developed over the centuries beginning with his early European scholarship tour and later through his personal trips to Europe and his constant contact with other artists, architects, and also through his professional and personal social networks and relationships, including with his wife, all of whom kept him in a constant learning mode.

Thus, the first lesson learned for today's entrepreneurs is to develop their mindfulness skill and apply it to their startups. Both Ford and Kahn had a well-developed mindfulness skill, and they applied it over and over again throughout their lives.

Second, both Ford and Kahn were visual thinkers and used visual analogies to innovate and experiment in their businesses. Ford could not read a blueprint, but found a talented young man, Charles Sorensen, who was a pattern maker to translate his ideas into physical objects, so he could better understand the attributes and qualities of an object or idea. Kahn was color blind, but this did not prevent him from seeing the essence of a building and the relationship among the interior and exterior spaces and how they "felt" and worked together. Ford and his team found practices in other industries, such as meat packing and mill houses, to use as visual analogies and adopted similar practices in his automobile manufacturing. Kahn could see how a client's building desire could be fulfilled by using a visual analogy to form a design and a building plan. Both men used their ability to visualize situations using analogy to gain insights and implement those ideas as concrete plans. Thus, each used the Wuity six step process again and again throughout their careers. Therefore, the second learning for today's entrepreneurs and their startups is to learn and practice visual analogy.

The third lesson learned is Wuity + Wuity is a powerful combination. Henry Ford and Albert Kahn collaboration demonstrated ground breading results in automobile manufacturing and architectural productivity. Kahn helped Ford solve the issues in factory building design of obstructed space, poor ventilation, limited light, and fire hazard. Ford helped Kahn solve the issue of high volume throughput of work in a sequential standardized but flexible work process. Ford's Wuity focused on a physical product or deliverable, while Kahn's Wuity focused on a knowledge product of building design plan.

The fourth lesson learned is that each founder, Ford and Kahn, relied on a talented team of individuals who could work together within their startups and with others outside their companies. They did not succeed on their own talent and skills but needed the collaboration of a diverse set of individuals working together toward a shared goal. Ford's team included: James Couzens, Harold Wills, Walter Flanders, Charles Sorensen and Ernest Liebold. Kahn's team included his three brothers: Julius, Moritz and Louis, along with architects Ernest Wilby and Wirt Rowland to name just a few.

The fifth lesson learned is that Gloor's six High Performance indicators neatly fit the attributes of Ford and Kahn's historical cases some 122 years ago, and we argue they remain relevant for today's startups. We suggest that entrepreneur's and their startup teams ask themselves six questions:

- Does our team have strong central leadership?
- Do we have evidence of rotating leadership?
- Do we have balanced contribution among our team members?
- How fast is our response to one another, our clients and our suppliers?
- Do our team members use honest language in our communication?
- Have we developed a shared context?

In summary, these five lessons provide today's entrepreneurs who are building a shared present and future some successful practices to emulate from the historical Co-Wuity relationship between Henry Ford the industrialist and Albert Kahn the architect and their high-performance teams.

5 Conclusion and Future Research

In conclusion, this paper's contribution to the literature is an interweaving of two streams of research based on Gloor's six directional indicators of high performance teams and the six process steps of Wang's Wuity using an historical archival case analysis method as exemplified by Weick and Sutcliffe. We believe that this is a fruitful line of scholarly inquiry to use the reexamination of historical events to elicit guidelines and principles for today's entrepreneurs and start-ups for building a shared present and future.

Wuity is a style of thought with the ability to gain intuitive understanding of underlying phenonium for insightful problem solving through a process of mindful observation and visual analogy. Mindfulness has a power to enable people to develop a thinking model for creativity and innovation for societal impact. Wuity makes a use of imagery, metaphors and analogy rather than concepts, logics and analysis. Given Wuity as a style of thought and information processing, we find in high-performance teams Co-Wuity interaction manifests as entangled minds through COINs memberships.

This entanglement is a spontaneous mind-to-mind and mind-to-matter interaction. The entanglement of minds or their mindful social interaction has three distinct features. The first feature, from a mindfulness perspective, is that team leaders and members don't invent anything, but they do innovate the next big thing. The second feature of their mindful social interaction is taking on another's perspective. Looking from the point of view of another is altruistic in a broad sense. Participants are using their Wuity visual thinking to build a bigger picture for team members to co-create. They are doing their parts for themselves, for others, and for the community. The third feature is through mindful inquiry, mindful observation, mindful learning and visual thinking, leaders and their teams enable to entangle their minds for co-creating a higher performance for a shared present and future. Our contribution is expanding Wuity research from the intrapersonal or individual level, to the interpersonal level and to the larger collective level, which is the social interaction through networks.

Finally, we recommend the continued development of more case studies for theory building connecting COINs, Wuity and mindfulness research.

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